Electroencephalographic Activity Before and After Cognitive Effort in Children With Attention Deficit/Hyperactivity Disorder.

Buyck I, Wiersema JR.


Abstract
Numerous studies have detected elevated electroencephalographic (EEG) theta/beta ratio (TBR) or theta power in children with attention deficit/hyperactivity disorder (ADHD) and therefore TBR has been suggested to be a promising biomarker of ADHD. At the same time, recent theoretical models have emphasized the heterogeneity of ADHD and the notion that cognitive deficits in ADHD are not fixed but fluctuate according to contextual and state factors. Surprisingly, so far the context- or state-dependency of EEG abnormalities in ADHD has hardly been addressed. Therefore, in the current study, 3 minutes eyes closed resting EEG before and after execution of 3 n-back tasks were compared between 21 children with ADHD and 22 typically developing children. No difference between groups was found for TBR or theta power (or other frequency bands), neither before nor after task execution, indicating that enhanced TBR or theta power is not to be considered universal for the disorder. Hence, cautiousness is warranted in using these indices for diagnostic purposes in ADHD. Across groups, posterior theta power, as well as central and posterior beta power was attenuated after task execution, which was interpreted as the children experiencing a more alert state after cognitive effort. Yet, this EEG modulation was similar in both groups, providing no support for a context-or state-dependency of EEG abnormalities in ADHD. However, in light of the absence of any group differences in EEG parameters, further research is warranted.